EFFECTIVITY OF INSULIN LEAF (SMALLANTHUS SONCHIFOLIUS) EXTRACT ON MICE MALONDIALDEHYDE (MDA) LEVELS FOR THE PURPOSE OF PREVENTING DEGENERATIVE DISEASE

ABSTRACT

Background: Yacon leaves (Smallanthus sonchifolius), or more commonly known as insulin leaves in Indonesia, contain phenolic compounds such as Chlorogenic acid and Tryptophan. These compounds inhibit oxidative reactions and can prevent free radicals, which are one of the causes of degenerative diseases. Free radicals within the body can be measured by analyzing malondialdehyde (MDA) levels within the blood serum. MDA can be classified as a biomarker of free radicals. The administration of toxic dose of paracetamol may cause hepatotoxicity that could trigger an increase in free radicals and malondialdehyde in the body. This is possible because the metabolites of paracetamol called N-acetyl-p-benzoquinone imine (NAPQI) produced by cythochrome p450, an enzyme in the liver, binds to protein in the liver cells and subsequently damages mitochondria of the liver cells causing levels of MDA to increase. Chlorogenic acid and tryptophan within insulin leaves can increase glutathione (GSH) levels, which is a natural antioxidant within the body that can neutralize NAPQI and prevent increased levels of MDA. **Purpose:** To find out the effectivity of insulin leaf extract in preventing free radical escalation on mice induced by a toxic dose of paracetamol by monitoring its MDA levels. **Method:** 30 mice were divided into 3 groups. A positive control group (Aquadest + paracetamol), treatment group I (Insulin leaf extract 300mg/Kg of body weight + paracetamol), treatment group II (Insulin leaf extract 500mg/Kg of body weight + paracetamol). Extracts were given for a period of 10 days and paracetamol induction was done on the 8^{th}, 9^{th}, and 10^{th} day. On the 11^{th} day, mice blood serum was taken and then the level of MDA was measured using a spectrophotometer with a wavelength of 532 nm. **Results:** Normality test with Kolmogorov Smirnov, homogeneity test Levene test, statistical test with One Way Anova, and post hoc test with Tukey, was found to have a significant difference between the positive control group and treatment group I. **Conclusion:** Insulin leaf extract with a dose of 300mg/Kg of body weight was found to be the most effective in preventing elevation of MDA levels after a toxic dose of paracetamol was induced.

Keywords: Free radicals, malondialdehyde, paracetamol, insulin leaf extract, chlorogenic acid, tryptophan.

EFEKTIVITAS EKSTRAK DAUN INSULIN (SMALLANTHUS SONCHIFOLIUS) TERHADAP KADAR MALONDIALDEHID (MDA) MENCIT UNTUK PENCEGAHAN PENYAKIT DEGENERATIF

ABSTRAK

Latar belakang: Daun yacon (Smallanthus sonchifolius) lebih dikenal sebagai daun insulin oleh masyarakat Indonesia, mengandung senyawa fenolik Chlorogenic acid dan Tryptophan. Senyawa tersebut dapat menghambat reaksi oksidatif dan menangkal radikal bebas yang merupakan penyebab dari penyakit degeneratif. Radikal bebas dalam tubuh dapat diketahui dengan mengukur kadar malondialdehid (MDA) dalam serum darah. MDA merupakan biomarker dari radikal bebas. Pemberian parasetamol dosis toksik dapat menyebabkan hepatotoksik yang dapat memicu peningkatan radikal bebas dan malondialdehid (MDA) dalam tubuh. Hal ini terjadi karena metabolit dari parasetamol berupa N-acetyl-p-benzoquinone imine (NAPQI) yang dihasilkan oleh enzim dalam hepar yaitu sitokrom P450 berikatan dengan protein sel hepar dan merusak mitokondria sel hepar sehingga kadar MDA meningkat. Chlorogenic acid dan tryptophan dalam daun insulin dapat meningkatkan kadar glutation (GSH) yang merupakan antioksidan alami dalam tubuh sehingga metabolit NAPQI dapat dinetralisir dan mencegah peningkatan kadar MDA. **Tujuan:** Mengetahui efektivitas dari ekstrak daun insulin dalam mencegah peningkatan radikal bebas pada mencit yang diinduksi parasetamol dosis toksik dengan mengamati kadar MDA. **Metode:** 30 ekor mencit dibagi dalam 3 kelompok. Kelompok kontrol positif (Aquades + parasetamol), kelompok perlakuan I (Ekstrak daun insulin 300mg/KgBB + parasetamol), kelompok perlakuan II (Ekstrak daun insulin 500mg/KgBB + parasetamol). Pemberian ekstrak selama 10 hari dan induksi parasetamol dilakukan pada hari ke - 8,9,10. Pada hari ke - 11, serum darah hewan coba diambil kemudian dilakukan pengukuran kadar MDA menggunakan spektrofotometer dengan panjang gelombang 532 nm. **Hasil:** Uji normalitas dengan Kolmogorov-Smirnov, uji homogenitas dengan Levene test, uji statistik dengan One Way Anova, serta post hoc test dengan uji Tukey, didapatkan perbedaan yang signifikan antar kelompok kontrol positif dan kelompok perlakuan I. **Simpulan:** Ekstrak daun insulin dosis 300mg/KgBB paling efektif dalam mencegah peningkatan kadar MDA setelah diinduksi parasetamol dosis toksik.

Kata kunci: Radikal bebas, malondialdehid, parasetamol, ekstrak daun insulin, chlorogenic acid, tryptophan.